REMARKS

I. Introduction

In response to the Office Action dated June 15, 2004, claims 1, 6 and 12 have been amended. Claims 1-12 remain in the application. Re-examination and re-consideration of the application is requested.

II. Prior Art Rejections

A. The Office Action Rejections

In paragraphs (4)-(5) of the Office Action, claims 1-7 and 9-12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lee et al., U.S. Patent No. 6,535,493 (Lee) in view of Curry et al., U.S. Patent No. 6,359,880 (Curry). In paragraph (16) of the Office Action, claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Lee in view of Curry as applied to claim 6, and further in view of Raychaudhuri et al., U.S. Patent No. 5,684,791 (Raychaudhuri).

Applicants' attorney respectfully traverses these rejections.

B. Applicants' Independent Claims

Applicants' independent claim 1 is generally directed to an internet protocol-based cellular telephone communications system, comprising:

a router;

a foreign agent (FA), coupled to the router;

a base transceiver station (BTS), coupled to the router, for communicating with a mobile telephone within a transmission area associated with the base transceiver station, wherein the router communicates with the base transceiver station using a cellular network interface; and

a home agent (HA), coupled to the router, wherein the home agent communicates with the router and the foreign agent for registering mobile telephones and transmitting messages using an internet-protocol network separate from the cellular network;

wherein messages are transmitted using the internet protocol network between the home agent and the router, and messages are transmitted using the cellular network interface between the router and the base transceiver station.

Applicants' independent claim 6 is generally directed to an internet protocol-based cellular telephone communications system, comprising:

a handoff server (HS);

a base transceiver station (BTS), coupled to the handoff server, for communicating with a mobile telephone within a transmission area associated with the base transceiver station, wherein the handoff server communicates with the base transceiver station using a cellular network interface; and

a home agent (HA), coupled to the handoff server, wherein the home agent communicates with the handoff server for transmitting messages using an internet-protocol network separate from the cellular network;

wherein messages are transmitted using the internet protocol network between the home agent and the handoff server, and messages are transmitted using the cellular network interface between the handoff server and the base transceiver station.

Applicants' independent claim 12 is generally directed to a method for communicating over an internet protocol-based communications network, comprising:

sending a message from a home agent (HA) to a router over an internet protocol based network;

forwarding the message from the router to a base transceiver station (BTS) using a cellular network interface, wherein the cellular network is not part of the internet protocol based network; and

forwarding the message from the base transceiver station to a mobile telephone that is within a geographical communications zone of the base transceiver station.

C. The Lee Reference

Lee describes an apparatus and a method route information to a mobile unit in a data communications system having a home network and a remote network. Each of the home and remote networks supports one or more mobile units and one or more stationary access points. The mobile unit has a unique address and may roam from the home network to the remote network. The mobile unit associates with one access point which serves as a home agent. When the mobile unit roams and is away from its home network, the apparatus discovers a physical location of the mobile unit by sending an agent advertisement packet from the access point. If the location of the mobile unit is not at the home network, the apparatus associates the mobile unit with one of the access points on the foreign network which serves as a foreign agent. Next, the apparatus registers the mobile unit with the home agent, encapsulates original data received by the home agent which is

destined for the mobile unit, forwards encapsulated data to the foreign agent, and converts the encapsulated data to the original data and delivers the original data to the mobile unit via the foreign agent.

D. The Curry Reference

Curry describes a localized wireless gateway system providing wireless telephone communication, and for at least interexchange communication, provides voice telephone access to a public packet data network, such as the Internet. The wireless gateway system includes base station transceivers and a packet service gateway coupling the transceivers to the public packet data network. The packet service gateway compresses and decompresses voice frequency communication signals, and it sends and receives the compressed signals in packet form via the network. The packet service gateway also provides for signaling through the network to establish two-way voice communication sessions. In the preferred implementation, the localized wireless gateway system includes at least one radio port control unit coupled to the base station transceivers for controlling calls through the transceivers. The localized wireless gateway system also includes a telephone switch, such as a digital PBX, selectively providing telephone communication channels between the radio port control unit(s) and the packet service gateway. An access manager controls registration and validation of roaming wireless telephones to utilize the wireless gateway system. The access manager also transmits location information for registered wireless telephones to a home location register database via the network. The communications of the access manager to the home location register database permit telephone authentication as well as maintenance of accurate location information in the home location register identifying the current gateway through which a caller can reach the roaming user's wireless telephone.

E. The Raychaudhuri Reference

Raychaudhuri describes a data link control procedure for wireless ATM access channels based on a dynamic TDMA/TDD framework provides integrated ATM services including available bit-rate (ABR) data and constant/variable bit-rate (CBR/VBR) voice or video through the addition of wireless-specific medium access control and data link control protocol layers between the physical and ATM network layers. Generally, a data link control is used to insulate the ATM network layer from wireless channel impairments by selective retransmission of erroneous or lost cells before they are released to the ATM layer. The data link control methods disclosed use the on-demand ABR

burst transmission capability of the dynamic TDMA channel to retransmit unacknowledged cells in available slots not allocated to service data. Specific error recovery procedures for both (asynchronous) ABR and (isochronous) CBR services are provided.

F. Applicants' Claimed Invention Is Patentable Over The Reference

Applicants' attorney respectfully submits that Applicants' claimed invention is patentable over the cited references. Specifically, Applicants' attorney asserts that the references, taken individually or in any combination, do not teach or suggest the specific combination of elements recited in Applicants' claims.

For example, Lee does not teach or suggest the limitations found in Applicants' independent claims directed to "a base transceiver station (BTS), coupled to the router, for communicating with a mobile telephone within a transmission area associated with the base transceiver station, wherein the router communicates with the base transceiver station using a cellular network interface," and "a home agent (HA), coupled to the router, wherein the home agent communicates with the router and the foreign agent for registering mobile telephones and transmitting messages using an internet-protocol network separate from the cellular network," in claim 1, "a base transceiver station (BTS), coupled to the handoff server, for communicating with a mobile telephone within a transmission area associated with the base transceiver station, wherein the handoff server communicates with the base transceiver station using a cellular network interface." and "a home agent (HA), coupled to the handoff server, wherein the home agent communicates with the handoff server for transmitting messages through an internet-protocol network separate from the cellular network," in claim 6.

The Office Action states that the previous limitations of Applicants' independent claims can be found at col. 2, line 51 – col. 3, line 4 and col. 4, lines 41–42 in Lee. However, at the indicated locations, Lee merely describes the following:

> Col. 2, line 51 – col. 3, line 4
>
> The invention provides an apparatus and a method of routing information to a mobile unit in a data communications system having a home network and a remote network. Each of the home and remote networks supports one or more mobile units and one or more stationary access points. The mobile unit has a unique address and may roam from the home network to the remote network. The mobile unit associates with one access point which serves as a home agent. When the mobile unit roams and is away from its home network, the apparatus discovers a physical location of the mobile unit by sending an agent advertisement packet from the access point. If the location of the mobile unit is not at the home network, the apparatus associates the mobile unit with one of the access points on the foreign network

which serves as a foreign agent. Next, the apparatus registers the mobile unit with the home agent, encapsulates original data received by the home agent which is destined for the mobile unit, forwards encapsulated data to the foreign agent, and converts the encapsulated data to the original data and delivers the original data to the mobile unit via the foreign agent.

Col. 4, line 41–42 (actually, lines 33-45)

Attached to the LAN 110 is a host computer 112 and a router 114. The router 114 receives packets from the LAN 110 and routes the packets to a second router 144 over an Internet 120. The Internet 120 represents a shift in communication technology, for data packets may be sent between routers 114 and 144 over long distances crossing state and national boundaries at essentially a fixed cost. Once the data packets are received by the router 144, the data packets in turn are transferred into a second LAN 140. Attached to the second LAN 140 is a host computer 142 as well as a plurality of base stations or APs 132-134. The base stations 132-134 in turn communicate via wireless links to a second mobile unit 130.

The above portions of Lee do not describe a router communicating with a base transceiver station using a cellular network interface, while a home agent communicates with the router (and a foreign agent) using an internet-protocol network separate from the cellular network. Instead, all networks in Lee are internet-network protocol networks.

In another example, Lee does not teach or suggest the limitations found in Applicants' independent claims directed to "wherein messages are transmitted using the internet protocol network between the home agent, and messages are transmitting using the cellular network interface between the router and the base transceiver station" in claim 1, "wherein messages are transmitted using the internet protocol network between the home agent and the handoff server, and messages are transmitted using the cellular network interface between the handoff server and the base transceiver station" in claim 6, and "sending a message from a home agent (HA) to a router over an internet protocol based network" and "forwarding the message from the router to a base transceiver station (BTS) using a cellular network interface, wherein the cellular network is not part of the internet-protocol network" in claim 12.

The Office Action states that the limitations of Applicants' independent claims can be found at col. 2, line 51 - col. 3, line 4 and col. 5, line 28 - col. 6, line 57 in Lee. However, at the indicated locations, Lee merely describes the following:

Col. 2, line 51 – col. 3, line 4

The invention provides an apparatus and a method of routing information to a mobile unit in a data communications system having a home network and a remote network. Each of the home and remote networks supports one or more mobile units

and one or more stationary access points. The mobile unit has a unique address and may roam from the home network to the remote network. The mobile unit associates with one access point which serves as a home agent. When the mobile unit roams and is away from its home network, the apparatus discovers a physical location of the mobile unit by sending an agent advertisement packet from the access point. If the location of the mobile unit is not at the home network, the apparatus associates the mobile unit with one of the access points on the foreign network which serves as a foreign agent. Next, the apparatus registers the mobile unit with the home agent, encapsulates original data received by the home agent which is destined for the mobile unit, forwards encapsulated data to the foreign agent, and converts the encapsulated data to the original data and delivers the original data to the mobile unit via the foreign agent.

Col. 5, line 28 – col. 6, line 57

To support roaming, a management facility within each of APs 102, 104, 132, and 134 handles event-driven tasks at a multi-tasking level. The facility modifies the AP's packet forwarding routines to tunnel datagrams when the AP acts as a home agent and to detunnel datagrams when the AP acts as a foreign agent. The tunneling and detunneling processes are specified in a standard called a RFC2003 standard, entitled "IP Encapsulation within IP."

The facility within the AP 102, 106, 132 and 134 generates a packet using a predetermined protocol such as a Wireless Network Management Protocol(WNMP) packet. The packet is of a type called "Agent Advertisement" whenever a mobile unit 100 associates with the respective AP. The Agent Advertisement packet is sent directly to the mobile unit 100 to determine whether the mobile unit 100 is still connected to its home subnet and to detect whether the mobile unit 100 has moved from one subnet to another. The format of one embodiment of an Agent Advertisement packet is as follows:

Header Fields
Destination Address--a MAC address of the mobile unit
Source Address--a MAC address of the mobility agent
Ethernet Type--0x8781
Message Type--60
Element
4 bytes--An IP address of the mobility agent
4 bytes--A care-of address which will be used for tunneling

Correspondingly, a facility within the mobile unit 100 generates a WNMP packet of type called "Agent Solicitation" only when it has not received the Agent Advertisement packet from its associated AP. The mobile unit 100 retries up to three times at a predetermined rate such as one transmission per second. The format of an Agent Solicitation packet is defined as follows:

Header Fields
Destination Address--a MAC address of the associated AP
Source Address--a MAC address of the mobile unit
Ethernet Type--0x8781
Message Type--61
Element
4 bytes--an IP address of the mobile node

Roaming, or the movement of the mobile node 100 or 130 can occur within the subnet or across routers to another subnet. Datagrams sent from the mobile unit 100 requires no tunneling support because IP datagrams are routed based on a destination address in the IP header and not a source address. However, datagrams being directed at the mobile unit 100 requires the mobility support facility. The first time a mobile unit 100 completes its association handshake with the AP 102 or 104, the subnet where the AP 102 or 104 is attached to becomes the mobile unit's home subnet and the AP 102 or 104 becomes the mobile unit 100's home agent. If the mobile unit 100 roams within the home subnet, the AP 102 or 104 which is newly associated with the mobile unit 100 becomes its home agent. In this manner, as long as the mobile unit 100 remains in the home subnet, datagrams destined to the mobile unit 100 will be delivered to it by using a standard IP routing mechanism.

As the mobile unit 100 roams (shown now as the mobile unit 130) and associates with an AP on a subnet other than its home subnet such as the APs 132 or 134, the mobile unit 100 is "visiting" a foreign subnet and the AP 132 or 134 associated with the foreign subnet becomes its foreign agent. If the mobile unit 130 roams within the foreign subnet or to another foreign subnet, the AP 132 or 134 which is newly associated with the roaming mobile unit 130 then becomes a foreign agent for the roaming mobile unit 130.

When away from home, the mobile unit 130 obtains a care-of address such as the IP address of its foreign agent, and uses its foreign agent to register this address with its home agent so that datagrams destined for the mobile unit 130 are forwarded to the foreign agent and then to the mobile unit 130 using the tunneling process. After the foreign agent succeeded in exchanging registration messages with the home agent, datagrams arriving at the home subnet for the mobile unit 130 are encapsulated by its home agent and sent to its foreign agent. Encapsulation refers to a process of enclosing an original datagram as data inside another datagram with a new IP header. Upon receiving the encapsulated datagram, the foreign agent strips off an outer header to reveal the original datagram and delivers it to the mobile unit 130 on the foreign subnet.

As an alternative for a care-of address, the mobile unit 130 may obtain a co-located care-of address by BOOTP/DHCP. The registration occurs between the mobile unit 130 and the home agent. The mobile unit 130 becomes the end of the tunnel and itself performs the decapsulation of the datagrams. Finally, when the mobile unit 130 detects that it has returned to its home subnet, it performs a deregistration process with its home agent.

Referring now to FIG. 2A, a schematic diagram of one embodiment of the mobile unit 100 or 130 is shown in more detail. The mobile unit 100 or 130 has a central processing unit (CPU) 200 which is connected using a bus to various memory devices, including a random access memory (RAM) device 202 and a read-only memory (ROM) device 204. Additionally, the CPU 200 is connected to a display device 206. The display device 206 may suitably be a liquid crystal display (LCD) device, an array of light-emitting diodes (LEDs), or a hard copy device such as a printer. Moreover, the display device 206 may have a touch-sensitive screen.

The above portions of Lee merely describe routing information to a mobile unit in a data communications system having a home network and a remote network, wherein both networks are

internet-protocol networks. Lee does not describe messages being transmitted using the internet protocol network between the home agent and the router, and messages being transmitted by the cellular network interface between the router and the base transceiver station (as in claim 1), or messages being transmitted using the internet protocol network between the home agent and the handoff server and messages being transmitted using the cellular network interface between the handoff server and the base transceiver station (as in claim 6), or sending a message from a home agent (HA) to a router over an internet protocol based network and forwarding the message from the router to a base transceiver station (BTS) using a cellular network interface (as in claim 12), wherein the cellular network is not part of the internet-protocol network.

Curry does not overcome these deficiencies in the Lee reference. Recall that Curry was cited merely for teaching an internet-protocol-enabled cellular telephone system. Thus, even when combined, Lee and Curry still teach away from Applicants' invention.

Similarly, Raychaudhuri does not overcome the deficiencies in the Lee and Curry references. Recall that Raychaudhuri was cited merely for teaching the use of an ATM protocol to communicate between a mobile phone and a BTS, and only against dependent claim 8.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Lee, Curry and Raychaudhuri. In addition, Applicants' invention solves problems not recognized by Lee, Curry and Raychaudhuri.

Thus, Applicants' attorney submits that independent claims 1, 6, and 12 are allowable over Lee and Curry. Further, dependent claims 2-5 and 7-11 are submitted to be allowable over Lee, Curry, and Raychaudhuri in the same manner, because they are dependent on independent claims 1, 6, and 12, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2-5 and 7-11 recite additional novel elements not shown by Lee, Curry, and Raychaudhuri.

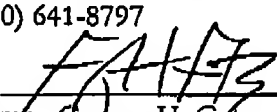
III. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited.

Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

GATES & COOPER LLP
Attorneys for Applicants
Howard Hughes Center
6701 Center Drive West, Suite 1050
Los Angeles, California 90045
(310) 641-8797

By: 
Name: George H. Gates
Reg. No.: 33,500

Date: September 14, 2004

GHG/amb

G&C 139.132-US-U1